



EUROPEAN COMMISSION

DIRECTORATE-GENERAL FOR AGRICULTURE AND RURAL DEVELOPMENT

Directorate B. Multilateral relations, quality policy

B.4. Organics

Expert Group for Technical Advice on Organic Production

EGTOP

Final Report On Wine

The EGTOP adopted this technical advice at the plenary meeting of 18 June 2015 and submitted the final version on 17 November 2015.

About the setting up of an independent expert panel for technical advice

With the Communication from the Commission to the Council and to the European Parliament on a European action plan for organic food and farming adopted in June 2004, the Commission intended to assess the situation and to lay down the basis for policy development, thereby providing an overall strategic vision for the contribution of organic farming to the common agricultural policy. In particular, the European action plan for organic food and farming recommends, in action 11, establishing an independent expert panel for technical advice. The Commission may need technical advice to decide on the authorisation of the use of products, substances and techniques in organic farming and processing, to develop or improve organic production rules and, more in general, for any other matter relating to the area of organic production. By Commission Decision 2009/427/EC of 3 June 2009, the Commission set up the Expert Group for Technical Advice on Organic Production.

EGTOP

The Group shall provide technical advice on any matter relating to the area of organic production and in particular it must assist the Commission in evaluating products, substances and techniques which can be used in organic production, improving existing rules and developing new production rules and in bringing about an exchange of experience and good practices in the field of organic production.

EGTOP Permanent Group

- Alexander Beck
- Jacques Cabaret
- Sonya Ivanova-Peneva
- Lizzie Melby Jespersen
- Keith Ball
- Wijnand Sukkel
- Nicolas Lampkin
- Giuseppe Lembo
- Evangelia Nikolaos Sossidou
- Bernhard Speiser
- Fabio Tittarelli
- Roberto García Ruiz
- Michel Bouilhol

Contact

European Commission

Directorate General for Agriculture and Rural Development

Directorate B: Multilateral relations, quality policy

Unit B4 – Organics

B-1049 Brussels

Functional mailbox: agri-exp-gr-organic@ec.europa.eu

The report of the Expert Group presents the views of the independent experts who are members of the Group. They do not necessarily reflect the views of the European Commission. The reports are published by the European Commission in their original language only, at the following webpage:

http://ec.europa.eu/agriculture/organic/eu-policy/expert-advice/documents/index_en.htm

ACKNOWLEDGMENTS

Members of the Group are acknowledged for their valuable contribution to this technical advice. The members are:

Permanent Group members:

- Keith Ball
- Alexander Beck
- Nic Lampkin
- Lizzie Jespersen
- Giuseppe Lembo
- Fabio Tittarelli
- Wijnand Sukkel
- Evangelia Nikolaos Sossidou
- Roberto Garcia Ruiz
- Michel Bouilhol
- Sonja Ivanova Peneva
- Bernhard Speiser
- Jacques Cabaret

Sub-Group members:

- Alexander Beck
- Cristina Micheloni

External experts:

- Enric Sebastian Barta
- Stephane Becquet (not participating in the meeting but cooperating in the preparation of the reports).
- Doris Rauhut
- Roberto Zironi

Secretariat:

- João Onofre
- Luis Martín Plaza
- Marina Predic Runtevska

All declarations of interest of Permanent Group members are available at the following webpage:
www.organic-farming.europa.eu

TABLE OF CONTENTS

1. BACKGROUND -----	5
2. TERMS OF REFERENCE -----	5
3. EXECUTIVE SUMMARY -----	7
4. GENERAL STATEMENT OF HOW TO UNDERSTAND "ORGANIC WINE QUALITY" IN REGARD TO OENOLOGICAL PRACTICES -----	9
5. CONSIDERATIONS AND CONCLUSIONS	10
5.1 HEAT TREATMENTS AS REFERRED TO IN POINT 2 OF ANNEX I A TO REGULATION (EC) NO 606/2009	10
5.2 ENRICHMENT	12
5.4 YEAST-MANNOPROTEINS.....	20
5.5 ENZYMATIC PREPARATIONS	23
5.6 USE OF INACTIVATED YEASTS, AUTOLYSATES OF YEAST AND YEAST HULLS	27
5.7 USE OF PROTEIN EXTRACTS OF POTATO	30
5.8 PROTEIN EXTRACTS OF YEASTS FOR CLARIFICATION	33
5.9 REASSESSMENT OF THE USE OF THE SUBSTANCES ALREADY DISCUSSED IN OTHER EGTOP REPORTS.....	35
5.10 REASSESSMENT OF THE USE OF THE SUBSTANCES ALREADY AUTHORISED IN ANNEX VIII A TO REGULATION 889/2008.....	38
6. MINORITY OPINIONS -----	39
7. LIST OF ABBREVIATIONS / GLOSSARY -----	39
8. REFERENCES -----	40

1. BACKGROUND

In recent years, several Member States have submitted dossiers under the second subparagraph of Article 21(2) of Council Regulation (EC) No 834/2007¹ concerning the possible inclusion, deletion or change of conditions for use of a number of substances in Annex VIIIa to Commission Regulation (EC) No 889/2008², or more generally, on their compliance with the above-mentioned legislation. Furthermore, several Member States have also requested evaluation of some techniques used in wine production in terms of their usefulness to and compliance with the EU organic farming legislation.

In addition, since 1 August 2010, several new oenological practices which have been authorised for conventional wines have not yet been considered for organic wines.

Besides, EGTOP has recently published the report on FOOD III, which includes recommendations on some substances used in the wine sector as provided by a group of general experts on food processing. The report also pointed out that the request from Italy to evaluate mannoproteins extracted from yeast for tartrate stabilisation of wines should be put before EGTOP as high priority.

As a subgroup of wine experts is being created especially to give its opinion on Article 29d(4) of Regulation 889/2008, it is appropriate that these wine experts assess again the use of those substances in wine sector, thus already evaluated by the subgroup on food III and give an updated opinion. Therefore, the Group is requested to prepare a report with technical advice on the matters included in the terms of reference.

2. TERMS OF REFERENCE

In the light of the most recent technical and scientific information available to the experts, the Group is requested:

1. To re-examine the use of the following oenological practices, processes and treatments with a view to phase out or to further restrict those practices, and to provide information on available practices, processes and treatments more in line with organic farming principles, which could substitute them:

- (a) heat treatments as referred to in point 2 of Annex I A to Regulation (EC) No 606/2009³;
- (b) use of ion exchange resins as referred to in point 20 of Annex I A to Regulation (EC) No 606/2009;
- (c) reverse osmosis according to point (b) of Section B.1 of Annex XVa to Regulation (EC) No 1234/2007⁴.

¹ Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91 (OJ L 189, 20.7.2007, p. 1)

² Commission Regulation (EC) No 889/2008 of 5 September 2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control, (OJ L 250, 18.9.2008, p. 1)

³ Commission Regulation (EC) No 606/2009 of 10 July 2009 laying down certain detailed rules for implementing Council Regulation (EC) No 479/2008 as regards the categories of grapevine products, oenological practices and the applicable restrictions (OJ L 193, 24.7.2009, p. 1)

⁴ Council Regulation (EC) No 1234/2007 of 22 October 2007 establishing a common organisation of agricultural markets and on specific provisions for certain agricultural products (Single CMO Regulation) (OJ L 299, 16.11.2007, p. 1)

2. To assess if the use of the substances/techniques listed below is in line with the objectives, criteria and principles as well as the general rules laid down in Regulation (EC) No 834/2007 and, hence, can be authorised for use in the making of products of the wine sector, including for the processes and oenological practices:

a) Substances

IT dossier (2014): **Mannoproteins** extracted from yeast for tartrate stabilisation of wines

b) Techniques:

IT dossier (2014): **Chromatographic cation exchange resins** for separation of glucose and fructose from rectified concentrated must.

3. To reassess the use of the following substances already discussed in other EGTOP reports:

a) FR dossier (2011): **Ammonium bisulphate, ammonium sulphate (E517), chitin-glucane and chitosan** for use or addition in organic products of the wine sector

b) DE dossier (2011) for **Thiamin hydrochloride and Diammonium hydrogen phosphate (DAP)** for the fermentation of organically produced fruit wines and meads

c) DE dossier (2008) **Wood fibres** as specific filter aid for wine

d) EGTOP suggestion in FOOD I report about **sulphur dioxide and potassium metabisulphite for the production of fruit wine** with and without added sugar at 100 mg/l

4. To reassess the use of the substances already authorised in Annex VIIIa to Regulation (EC) No 889/2008.

5. In preparing the final report, the Group may also assess if any amendment introduced after 1 August 2010 as regards the practices, processes and treatments for the production of wine, provided for in Regulation (EC) No 1234/2007 and Regulation (EC) No 606/2009, are in line with the organic farming principles.

In this respect, France sent a letter (2015) concerning the use of pectolytic enzymes, inactivated yeasts and protein extracts, as follows:

a) use of **pectolytic enzymes** for maceration, clarification, stabilisation and filtration according to Regulation (EC) No 606/2009 and Regulation (EC) No 479/2008

b) use of **inactivated yeasts, autolysates of yeasts** allowed to promote the growth of yeasts, and yeast hulls in addition to the Diammonium Hydrogen Phosphate (DAP)

c) use of **Protein extracts of potato** and protein extracts of yeasts for clarification

In addition, the following oenological practices have been authorised by the EU legislation for conventional wines:

a.) use of **enzymatic preparations** for oenological purposes in maceration, clarification, stabilisation, filtration and to reveal the aromatic precursors of grapes present in must and wine;

b) acidification and deacidification by means of **electromembranary treatment**;

c) reduction in sugar content of must through **membrane coupling**;

d) acidification by treatment with **cations exchangers**;

e) management of dissolved gas in wine using membrane contactors;

Deadline

Deadline for adoption of the final report: **31 July 2015**.

3. EXECUTIVE SUMMARY

General consideration

In wine, the main focus is given to sensorial properties and, even for organic wine, these are dominating principles but they should go hand in hand with the concept of “naturalness”. The underlying concept for organic wine is orientated toward optimisation of organoleptic properties obtained through processes that respect the naturalness of the product. Besides, the search for whole quality or multi-sided quality should be considered.

The market issue or the “production cost” is not relevant for the purpose of this dossier.

Heat treatment

The group agrees to keep the thermic treatments allowed in organic must and wine production provided they are consistent with general regulation and to remove the specific maximum temperature limit in the Organic Regulation. The group thinks these applications, as physical methods, within Article 6(d) of Regulation (EC) No 834/2007, are in line with aims and principles of organic regulation as no better alternatives are available. The group recommends reassessing this technique for the use in wine processing after a certain period, with the purpose of phasing out or further restricting the application of thermic treatments.

Enrichment

The Group reaffirms the conclusion in the FOOD III report and considers that it is essential to evaluate ion exchange resins and the use of the products thereof in their specific application in organic food. For the specific use on wine the group assessed its strictly regulated regime and the low dosage allowed.

The Group concludes that:

- The use of ion exchange resins for the production of organic rectified concentrated must (RCM) for use in organic wine processing is in line with the objectives, principles and criteria of the organic regulation. Chromatographic cation exchange resins technique is not authorized for conventional wine according to Commission Regulation (EC) 606/2009.
- The use of reverse osmosis for self-enrichment of organic must is in line with the objectives, principles and criteria of organic regulation. The reason for acceptance of these technologies is the lack of viable alternatives for the time being (Article 21(1)(i) of Regulation (EC) No 834/2007). The group recommends to reassess the possibility to phase them out in due time, when alternatives may be available.

New technologies (electromembranary treatment; membrane coupling; cations exchangers; membrane contactors)

These 4 techniques are not needed by the organic wine sector (Art 21(1)(ii) of Regulation (EC) No 834/2007) and are not in line with the objectives, principles and criteria for organic regulation. Alternatives already allowed in the (Article 21(1)(i) of Regulation (EC) No 834/2007) are preferable from an environmental point of view (Article 3(a)(iii) of Regulation (EC) No 834/2007) and in the light of respect of true nature of the product (Article 6(c) of Regulation (EC) No 834/2007). The Group recommends not to include these techniques in the organic regulation.

Yeast mannoproteins

The use of mannoproteins for wine stabilisation of wine is in line with the objectives, principles and criteria of the the organic regulation. The group considers that mannoproteins seems to be available in organic quality and should therefore be used.

Enzymatic preparations

The listing of enzymes as mentioned in Annex VIIIa to Regulation (EC) No 889/2008 is currently in line with the objectives, principles and criteria of organic regulation. However, there should be a complete review of the role of enzymes in organic food processing in the future. In case that new enzymes are authorised in the general wine production regulation, the authorisation for organic wine production should be separately evaluated.

Inactivated yeast, autolysates of yeast and yeast hulls

The use of inactivated yeast, autolysates of yeast and yeast hulls for organic wine making is in line with the objectives, principles and criteria of organic regulation. The group considers that yeast derived products are available in organic quality. The availability of those products in sufficient quantity and quality needs to be checked.

Potato protein

The use of potato protein for wine fining is in line with the objectives, principles and criteria of the organic regulation. The group considers that potato protein is available in organic quality and should therefore be used as such.

Yeast protein extracts

The use of yeast protein extracts for fining of wine is in line with the objectives, principles and criteria of the organic regulation. The group considers that it can be produced in organic quality. If organic yeast protein extracts are available in organic quality they should be used.

Reassessment of some conclusions in EGTOP Food I and III reports

The Group agrees with the conclusions in EGTOP Food I and III reports on Ammonium sulphate, Ammonium bisulphite, Chitin-glucan, Thiamin hydrochloride, Diammoniumphosphate, Sulphur dioxide and Metabisulphite. Following new information provided in the context of this mandate, the Group now considers that the use of Chitosan is in line with the objectives, principles and criteria of the organic regulation.

4. GENERAL STATEMENT ON OF HOW TO UNDERSTAND "ORGANIC WINE QUALITY" IN REGARD TO OENOLOGICAL PRACTICES

The Group would like to point out at the beginning of the wine report that organic wine rules have some differences from other organic processed foods. The practical circumstances in the background of requirements for organic wine making are characterised by the following cornerstones:

- In wine-making it is already allowed to use a long list of additives and processing aids
- the technological development in the wine sector is fast and broad, and leads to a need for frequent assessment of innovation, but at the same time if innovation is available, probably some older and less acceptable techniques and inputs could be phased out (Maintaining both innovations means that the old ones do not help pushing the improvement of the sector and do not comply with the principles of the organic production).

What should guide the assessment?

Wine is a product where the main focus is given to organoleptic properties like taste, flavour and appearance. Even for organic wine these are dominating principles, but should go hand in hand with the concept of “naturalness” that somehow has a different meaning for organic wine compared to primary foods products like bread or cheese. The underlying concept of organic wine is oriented toward optimisation of organoleptic properties obtained through processes that respect the naturalness of the product.

Beside the principles and objectives defined above, the search for whole quality or multi-sided quality meaning sensorial, “true nature” but also environmental aspects, such as energy or water consumption should be considered.

Consideration of the market issue or the “production cost” is generally avoided.

On the other hand there is a clear need to make the identity of organic wine stronger, as the actual legal definition Regulation (EC) No 203/2013 opened spaces for other “alternative/natural” wine definitions that would be advisably included in the organic definition. This would allow a more competitive development of the organic wine sector and strengthening of consumers' trust.

5. CONSIDERATIONS AND CONCLUSIONS

5.1 Heat treatments as referred to in point 2 of Annex I A to Regulation (EC) No 606/2009

Introduction

Heat treatment, currently limited to 70°C (158°F) in the framework of the European organic regulation, is one of the points subject to re-evaluation by the European Commission before 1 August 2015. The regulation specifies that it will be re-evaluated “with a view to phase out or further restrict [it]”.

Authorisation in general production and in organic production

Heat treatment is referred to in point 2 of Annex 1A to Regulation (EC) No 606/2009 dealing with the methods for application of the wine sector Common Market Organization (CMO) (Council Regulation (EC) No 479/2008⁵):

Heat treatments are authorised without restriction or limits on temperature in the regulation of the wine sector (EC) No 606/2009.

Like the other oenological practices listed in this annex 1A, they are applicable to the following products: (article 1 of Regulation N°479/2008): grape juice, grape musts, wine of fresh grapes including fortified wines, fresh grapes other than table grapes, wine vinegar, piquette, wine lees and grape marc.

Agronomic use, technological or physiological functionality for the intended use

Heating of harvested grapes is a winemaking practice that was much studied for red wines in the 1970s.

Its implementation at the time allowed for treatment of grapes affected by grey rot and so difficult to vinify in the traditional way. Heat is used to destroy the oxidase activity of enzymes resulting from *Botrytis cinerea* (laccase and tyrosinase).

The other major function is the reduction in fermentation tank space requirement. After heating the grapes, the solid fraction (skins, pulp, seeds . . .) is removed by pressing and it is only the “liquid phase” that undergoes fermentation.

Finally, heat has an interesting potential for working on colour extraction and on the aromatic profile of wines.

- “Classic” thermovinification

Historically, this was the first process developed: a short length of treatment, as from 10 minutes to 1 hour by heating the mass of grapes up to 70- 75°C. The vintage is then pressed and cooled before the liquid phase goes into fermentation.

- “Flash-release”

After a short period of heating to 90°C, the grapes are cooled to under 40°C and under vacuum. This “relaxation” results in destruction of the cells, favouring colour extraction.

- Pasteurisation ensures microbial stability through heat by inhibiting the ability of micro-organisms (yeasts, bacteria, moulds) to reproduce. It is not possible to make the product completely sterile at these temperatures (equivalent to zero microbes) but it is possible to obtain a product said to have “low contamination” with <1 microbe/100 ml.

⁵ Council Regulation (EC) No 479/2008 of 29 April 2008 on the common organisation of the market in wine, amending Regulations (EC) No 1493/1999, (EC) No 1782/2003, (EC) No 1290/2005, (EC) No 3/2008 and repealing Regulations (EEC) No 2392/86 and (EC) No 1493/1999 (OJ L148, 6.6.2008, p. 1)

Several processes are used in oenology:

- Pasteurisation: heating of wine to 70°C for about 1 minute
- Hot bottling: heating of wine to 40-50°C only during bottling, followed by slow cooling in the bottle
- Flash pasteurisation: heating of must or wine to 72-74°C for 15-30 seconds.

Food quality and authenticity

Micro-organisms have different resistance to heat depending on the nature of the strain concerned and the conditions of the environment. For each micro-organism there is a pasteurisation value (the pasteurisation unit: PU) which corresponds to the determination of the temperature per treatment time required for its elimination. Work on pasteurisation scales show that it requires about: 154 PU to achieve microbial stability in dry wines, with a low level of micro-organisms, and 232 PU fortified wines (Bru Girard et al, 1988).

Time/temperature to achieve the PU required for wine: (Deveze, 1977)

Temperature (°C)	Time (in seconds) for a PU of about 150	Time (in seconds) for a PU of about 232
68	155 (~3 min)	230 (~4 min)
70	55	84
72	20	30
74	7	11

During the industrialisation of the process the temperature-time of 72°C in 20 seconds was selected for flash pasteurisation (a very short heating time). Below this temperature, the increase in the heating time risks causing Maillard reactions resulting in a “cooked taste”. For wines with a higher microbial load or higher sugar content, it is the temperature that should be increased rather than the heating time so as to preserve the organoleptic quality of the wines.

At present, flash pasteurisation is the heat treatment with the least impact on wine quality. However, beneficial microorganisms are destroyed and nutrients are reduced.

Reflection of the group

Heat treatments can be used on must (including crushed grapes and juice) and/or on wine.

In the case of must treatments, for botrytised grapes, it is needed to inactivate oxidative enzymes (as for laccase, it affects colour stability in red wines and the effect of SO₂ on laccase is very weak). For this purpose there are so far no alternatives. The best technique available to date is heat treatment that can be applied at different temperatures and for different time lengths.

In the case of production of concentrated musts (including rectified ones) heat treatment in multistep (at different temperatures progressively increasing) is necessary to reach the required microbiological stability.

For application on wine, the technique is becoming outdated and is gradually replaced by better techniques such as microfiltration, which better preserves qualities and consumes less energy. Microfiltration is rarely applied in farms where wine is produced and bottled, but rather in few

large scale bottling plants, usually with high investment. Among heat treatments for wine, flash pasteurisation is the best in terms of impact on wine organoleptic quality and as a consequence it is an advisable choice for the time being.

The reflections of the group are:

- For must treatments, there are no viable alternatives so far. The group advises to maintain its use and to revise it if and when alternatives are available. The group advises as well to remove the maximum temperature limit in order not to limit improved technologies (higher temperatures in shorter time). In addition, used temperatures are extremely difficult for inspection bodies to check, so the implementability and inspectability of the current temperature limitation is questionable.
- For wine treatments, it will become obsolete if there are better alternatives available. If so, the group recommends reconsidering this topic after a time period with the target to phase out the technique from the organic regulation. Meanwhile, it is recommended to allow flash pasteurisation, but to eliminate the limit for the maximum temperature of the treatments, also because it is difficult to verify its compliance by the inspection bodies.
- In the case of must which is NOT intended for wine production but for the production of concentrated must/sugar/balsamic vinegar etc., and in the case of production of ingredients for special wines (e.g. Marsala and Vermouth) no limitation in temperature treatments is indicated, but it should be clearly stated, as the existing regulation induces misleading interpretations.
- For “Flash release”, the destruction of the cells by the use of “decompression”, modify the true nature of the product by an over-extraction and is clearly not in line with organic wine production.

The group recommends before the next revision, to gather data from MSs on the use of heat treatment techniques in terms of number of wineries and wines treated as well as the range of time periods and temperatures used for different processes.

Conclusions

The group agrees to keep the thermic treatments allowed in organic must and wine production provided they are consistent with the general regulation, and to remove the specific maximum temperature limit in the organic regulation. The group thinks that applications in both must and wine production, as physical methods (Article 6(d) of Regulation (EC) No 834/2007), are in line with aims and principles of organic regulation as no better alternatives are available. The group recommend reassessing the technique for the use in wine processing after a certain period, with the purpose of phasing out or further restricting the application of thermic treatments.

5.2 Enrichment

Introduction, scope of this chapter

Concerning enrichment the group was requested to assess:

- a) the need to continue allowing the use of ion exchange resins as referred to in point 20 of Annex I A to Regulation (EC) No 606/2009,
- b) the need to continue allowing the use of reverse osmosis as referred to in point B.1, letter B of Annex XV b to Regulation (EC) No 1234/2007, and
- c) the chromatographic cation exchange resins for separation of glucose and fructose from rectified concentrate.

The enrichment of musts and wines is a practice authorised within the framework of the organic wine regulation. Wine growers can use:

- additive methods, ATE (Additive Techniques of Enrichment), by adding organic saccharose, concentrated must or rectified concentrated must;
- subtractive methods, STE (Subtractive Techniques of Enrichment), by partially removing water by means of physical techniques: reverse osmosis, vacuum evaporation, evaporation with atmospheric pressure or cold pressing.

In the Food I report (2012), EGTOP discussed the use of ion-exchange and adsorption technology for production of “natural fruit sweeteners” based on carob of a high purification level, as a request from Spanish in 2011.

In the Food III report (2014) EGTOP discussed the use of ion-exchange in global organic production, but as recommended in the first food mandate, the evaluation must be based on specific application and cannot be done in general, in order to address the aims and principles of organic regulation. So, in this report, EGTOP focussed on three cases:

- demineralisation and neutralisation of fruit juice concentrates, including the special case of rectified concentrated must;
- the use of those technologies in the context of starch scarification;
- the use of those technologies for the preparation of ingredients (whey and starch based products) for the production of baby foods.

In the present “Wine” mandate, the question is about the acceptability of the use of ion-exchange resins for the production of rectified concentrated must (RCM), to be used in organic wine production for enrichment of musts, sweetening of wines, elaboration of liqueur d'expédition (champagne, cava...).

Additionally, there is a request from Italy (with related dossier) asking for authorisation of inclusion of chromatographic cation exchange resins for the separation of glucose and fructose from RCM that can lead to the production of powdered RCM. Even though the supplied dossier asks for inclusion of the technique in Annex VIII, section B to Regulation (EC) No 889/2008, the mandate does not deal with the inclusion, but with the acceptability of its use in the production of RCM, as an ingredient of organic wine.

The two dossiers are linked and were discussed together, as they are involved in the production of the same product that can be used as ingredient for organic wine production.

Authorisation in general production and in organic production

Ion-exchange and adsorption technology, including anion and cation exchange are widely used in food processing and water treatment in the EU. (Regulation (EC) No 1935/2004).

Ion exchange resins are mentioned in point 20 of annex 1A to Regulation (EC) No 606/2009 dealing with the methods for application of the wine sector Common Market Organization (CMO) (Regulation (EC) No 479/2008):“Use of ion exchange resins, only with grape must intend for the manufacture of rectified concentrated grape must under the conditions set out in Appendix 4.”

The organic legislation forbids the use of cation exchangers to ensure tartaric stabilisation in wine processing (Article 29d(2)(e) of Regulation (EC) No 889/2008), but authorises the use of ion exchange resins for the must preparation during the transition period, through Article 29d(4)(b) of Regulation (EC) No 889/2008, with the additional comment: "The use of ion

exchange shall be re-examined by the Commission before 1 August 2015 with a view to phase out or to further restrict those practices."

In the NOP (National Organic Program) of the USDA (U.S. Department of Agriculture), the ion exchange resins can be used in accordance with the production of products that meet the requirements of the Standard USDA-NOP, provided however, that the substances necessary for the regeneration /cleaning of the resins are listed in the national lists of permitted substances.

Reverse osmosis is authorised in wine making in accordance to Resolution Codex OIV: 30/2000 (membranes for reverse osmosis) and Resolution Codes International Oenological Practices: OENO 2/98 based on Regulation (EC) No 1234/2007 as amended (articles 120, 121 for the oenological practices) and application for the oenological practices: Regulation (EC) No 606/2009. The use of reverse osmosis is authorised in the EU organic wine production but needs to be re-examined by 1 August 2015.

Agronomic use, technological or physiological functionality for the intended use

Ion Exchange resins (see EGTOP Food I and III reports)

The evaluation requested in the context of this mandate is on grape sugar production. There are two types of grape sugar: RCM = rectified concentrated must or RCJ = rectified concentrated juice. Grape sugar is an ingredient in the form of sugary syrup (where the highest purity is looked for). It is mostly used to raise alcoholic content of wines but also as diet sweetener and as a liqueur d'expédition in the context of traditional method for the production of sparkling wines (champagne, cava...). The must is submitted to demineralisation process by means of ion exchange resins, for the production of grape sugar composed of about 50% fructose and about 50% glucose. Red or white must contains about 200 g/l of sugars, organic acids, polyphenols, amino acids and mineral salts.

During demineralisation mineral cations and amino acids are exchanged by cation resin, while mineral anions and organic acids by anion resin. Other macromolecular compounds such as proteins, polysaccharides and polyphenols are adsorbed on the resin. This last one reversibly adsorbs polyphenols producing a transparent water solution which contains about 200 g/l of sugars. The concentration of these sugars is commonly expressed in "Brix" (1° Brix = 10 g/Kg). The conductivity of starting must is around 2500 µS/cm given by the presence of mineral salts etc. The conductivity of demineralised and decolourised must is below 10µS/cm.

As alternatives to ion exchange, reverse osmosis or chromatography may be considered.

Reverse osmosis

Reverse osmosis is defined as must concentration by elimination of a part of water through a specific membrane and under the effect of pressure, higher than the osmotic pressure of the must.

Technical description

The system of reverse osmosis is established by the following elements:

- a high-pressure pump which ensures the rise in pressure from 60 to 120 bars.
- a module or a set of modules containing the semipermeable membranes. The current membranes hold more than 99.5 % of the elements of the must, except water.
- a discharge valve which maintains the pressure in the system.

Chromatography

The term chromatography indicates a set of techniques that have the purpose of separating a mixture into its components according to their different affinity towards a stationary phase and a

mobile phase. In liquid chromatography, the stationary phase is constituted by a matrix formed from resins, while the mobile phase is constituted by an aqueous solution.

Chromatographic resins can be used in the processing of foodstuff.

In chromatography, reagents for regeneration are not applied and the resins work as a physical separation vehicle of atoms and molecules. Each molecule in solution has a specific affinity with the resin and thanks to this property the separation takes place.

In this chromatographic production of high fructose syrups, the resins do not exchange ions but absorb and "slow down" the fructose, moving down the column. On the surface, the resin has pores of such size that the carbohydrate molecules with higher molecular weight cannot physically pass through the small openings between the polymer chains of the resin gel, so that it can also make a separation between large and small molecules and can, therefore, also be used as a size exclusion chromatography.

The effect of other parameters is rather obvious if thinking about the mechanism of separation. If a mixture of glucose and fructose dissolved in water is pumped through a fixed bed of resin in calcium form, the fructose, being more strongly attracted by the calcium ion in the bed resin, spends more time immobile within the resin, while the glucose, being less attracted, spends more time out of the bed, in the flow of the liquid between the "gaps" of the resin bed. The resin has more affinity to fructose and a first fraction rich in glucose is collected from the bottom of the column, while subsequently a second fraction of fructose comes out. The physical-chemical characteristics of the sugar molecules are unchanged.

For the main argumentation line see EGTOP Food I and III reports on the use of ion exchange and adsorbent resins.

Food quality and authenticity

Ion exchange and adsorbent technologies influence the food on a molecular level. Selected constituents can be removed or a single constituent within the food can be selectively purified from the rest of the original food. This means that it is possible to remove, for example, some specific minerals from a product or to purify raw material from all the other constituents, so that would finally only one substance remain.

As said in EGTOP Food III report, the end product is completely different from the original natural raw material. Both technologies change deeply the original character of the food at molecular level. The refining process seeks to remove "impurities" from the food. In this case, naturally occurring minerals, vitamins, proteins, colour and flavour are the "impurities". The nutritional quality (nutrients density) of the product is very low because, in fact all the nutrients, except glucose or fructose are removed, which is not in line with Article 3(b) of Regulation (EC) No 834/2007. Reverse osmosis is removing water from grape juice and has no negative impact on food quality and authenticity.

In this report we discuss the use of ion exchange techniques, cation exchangers and reverse osmosis as regards the production of RCM used as ingredients in the production of organic wine. Due to the limited amount used and the restrictive authorisation procedure for its use, it is the Group's opinion that even if ion exchange techniques alter the true nature of treated must it does not affect the true nature of wine.

Reflections of the group/ Balancing the arguments in the light of organic production principles

Primary assessment (before Regulation (EC) No 203/2012 entered into force) of the compatibility of ion exchange resins use in organic wine production was negative, due to the impact on product identity. Nevertheless, it was considered acceptable because, there were so far

(and are still) no alternatives in the production of RCM, and because it is not used on the total amount of a product, but only on production of a minor (less than 1.5%) ingredient. In some exceptional cases (adverse climatic conditions), it is used under specific authorisation by the national authorities. To conclude, it is a technique used on a small part of ingredients and with the scope of quality improving.

EGTOP Food III Report

Reflections of the group

The Group is of the opinion that ion exchange and adsorbent resins must always be evaluated in accordance with the specific, planned usage (technological application), and cannot be appropriately evaluated for general use. The applications must be carefully evaluated on the basis of technical dossiers.

Conclusion

The Group concludes that the use of ion exchange and adsorption resins, as processing aids for highly purified substances production, such as glucose and fructose (decomposed food)(Cases 1 & 2), is not in line with the objectives, criteria and principles of organic farming as laid down in the organic regulation. This is due to the high purification levels, which could mislead the consumer regarding the true nature of the product (Articles 19 3), (Article 6 (c)) and the chemical processes involved (Articles 4 and 21 (1)).

In the case where minerals are removed in order to fulfil the requirement of the infant formula legislation (Case 3), the use of ion exchange and adsorbent resin techniques is in line with the requirements of the organic regulation. Because of the specific status of those products in organic regulation (Article 6 (b)) and (Article 19 2 (b)), the target of the application is the selective removal of substances, such as minerals and not an overall decomposition.

In general EGTOP reaffirms the findings and considerations given in EGTOP Food I and III reports on the use of ion exchange and adsorbent resins in the production of organic food.

The Food III report questions whether “*wine grape must concentrate (more acceptable in organic production) can totally substitute the use of RCM*”. The Group is now reassured that without rectification not only the sugar is brought into the wine, but also colour and aromas, and that that can influence the organoleptic characteristics of the wine. Usually CM (concentrated must) is produced in sunny and dry areas, while RCM are needed in areas or seasons with low temperatures or high rainfall. The varieties and wine types produced in the two areas are different, and without rectification the must from one area cannot be mixed with the wine of other, without affecting wine's identity and quality. That is why CM is not allowed for use in PDO and PGI wines, while RCM is allowed. In areas of the EU where sugar is not allowed, there are no viable alternatives apart from self-enrichment, which is not economically viable for small enterprises.

At present, the only other alternative to RCM in organic production is self-enrichment by evaporation (in vacuum) or osmosis. It is always done by big plants due to the cost of the equipment which is used only in some years. This means that for small farms it is not really an alternative. The technology for self-enrichment is not available for/accessible to all wine enterprises in Europe.

Concerning consumer's acceptance, according to the Groups' opinion, it is unlikely to mislead the consumers, as the wine is not treated with ion exchange resins. The ion exchange resins are used to produce RCM. Furthermore, RCM is limited with the maximum increase of alcoholic

strength by volume, which cannot exceed 1,5 %, 2 % or 3 % according to the zones, and can have the effect of increasing the initial volume of no more than 11 %, 8 % and 6,5 % according to zones.

All the rules concerning the enrichment are provided in Annex XVa to Regulation (EC) No 1234 / 2007 as amended. Also, enrichment must be authorised on annual level by MSs based on climactic conditions according to the wine regulation.

Concerning the request to use **chromatographic resins**, the expert group highlights that it is not in the scope of this mandate to discuss the use of those techniques for other foods than wine. Chromatographic cation exchange resins technique is not authorized for conventional wine according to Commission Regulation (EC) 606/2009.

Chromatographic resins are not processing aids, so they should not be included in Section B of Annex VIII to Regulation (EC) No 889/2008 as requested with the dossier. They represent a method for the production of RCM in solid form, and they can also be used to produce powdered fructose for other food processing (use of fructose and glucose separately is not allowed for use in wine as defined by wine regulation (EC) No 606/2009). On the contrary, the mixture of glucose and fructose is included under the wine regulation as RCM, and as such has been already authorised for use in organic production, which is why it does not need to be authorised in a different way as RCM does.

Compared to usual techniques for the production of RCM, chromatographic resins have the advantage of not requiring the regeneration of resins in the last phase, which reduces the risk of unwanted residues. The powder produced with chromatographic resins is easier to handle, can be stored for long time, used in precise dosages and is more manageable for small cellars.

The Group recommends authorisation of the use of powdered RCM obtained through ion exchange resins as an ingredient for organic wine production.

Concerning the use of fructose in products other than wine, it is out of the scope of this mandate and has not been thoroughly evaluated by the group. The experts highlight that nowadays conventional fructose is still allowed in Annex IX. As innovative methods for the production of organic fructose become available, conventional fructose should be phased out.

Conclusion

The Group reaffirms the conclusion in the FOOD III report and considers that it is essential to evaluate ion exchange resins and the use of the products thereof in their specific application in organic food. For the specific use on wine, the group's assessment included its strictly regulated regime and the low dosage allowed.

The Group concludes that:

- The use of ion exchange resins for the production of organic RCM, for the use in organic wine processing is in line with the objectives, principles and criteria of organic regulation. Chromatographic cation exchange resins technique is not authorized for conventional wine according to Commission Regulation (EC) 606/2009.
- The use of reverse osmosis for self-enrichment of organic must is in line with the objectives, principles and criteria of organic regulation.

The reason for acceptance of these technologies is the lack of viable alternatives for the time being (Article 21(1) (i) of Regulation (EC) No 834/2007). The group recommends reassessment of the possibility to phase them out in due time, when alternatives become available.

5.3 New techniques allowed by wine regulation

Introduction, scope of this chapter

The following oenological practices have been authorised by the EU legislation for conventional wine:

- a. Use of enzymatic preparations for oenological purposes in maceration, clarification, stabilisation, filtration and to reveal the aromatic precursors of grapes present in must and wine;
- b. Acidification and deacidification by means of electromembrane treatment;
- c. Reduction in sugar content of must through membrane coupling;
- d. Acidification by treatment with cations exchangers;
- e. Management of dissolved gas in wine using membrane contactors;

Regulation (EC) No 144/2013 has amended Regulation (EC) No 606/2009 and introduced the authorised use of deacidification by electromembrane treatment.

The use of enzymatic preparations is completely evaluated in the context of this mandate (Chapter 5.5).

For the remaining techniques the group is delivering within this chapter and the table below a rough estimation of the cases.

Technique	Alternative already allowed in organic (article 21(1)(i) of Regulation (EC) No 834/2007)	Necessity (article 21(1)(ii) of Regulation (EC) No 834/2007)	Preferable to alternative regarding environmental impact?	Preferable to alternative regarding impact on true nature of the product? (article 6(c) of Regulation (EC) No 834/2007)	Is it miming natural processes? (article 19(3) of Regulation (EC) No 834/2007)
<i>Acidification and deacidification by means of electromembrane treatment</i>	Natural organic acid addition (lactic, tartaric acids); cold treatments and organic salts (calcium carbonate, neutral potassium tartrate, potassium bicarbonate) for wine cation separation.	No, as alternatives authorised in organic are sufficient and preferable.	No, due to high energy consumption.	No, as it can impact the nature of wine more than authorised alternatives that are traditionally used.	No, it is not a simple reaction, nor a physical process.
<i>Reduction in sugar content of must through membrane coupling</i>	No alternatives as no problem was raised.	No, as no requests for this were shown.	Not pertinent	Not at all, better to work at vineyard level with prevention strategies.	No, it is not a simple reaction, nor a physical process.
<i>Acidification by treatment with cations exchangers</i>	Natural organic acid addition (lactic, tartaric acids).	No, as alternatives authorised in organic are sufficient and preferable.	No, due to high energy consumption.	No, as it can impact the nature of wine more than authorised alternatives that are traditionally used.	No, it is not a simple reaction, nor a physical process.
<i>Management of dissolved gas in wine using membrane contactors</i>	Bubbling devices or venturi type systems for distribution of inert gases (CO ₂ , nitrogen, argon)	No, as alternatives authorised in organic are sufficient and preferable.	No, due to high energy consumption	No impact at all	No, it is not a simple reaction, nor a physical process.

Conclusions

All of the 4 techniques mentioned in the table above are irrelevant to the organic wine sector and are not in line with the objectives, principles and criteria of the organic regulation. Alternatives already allowed in organic production are preferable from an environmental point of view (Article 3(a)(iii) of Regulation (EC) No 834/2007) and from the in the light of respect of true nature of the product (Article 6(c) of Regulation (EC) No 834/2007). The Group recommends not to include these techniques in the organic regulation.

5.4 Yeast-mannoproteins

Introduction, scope of this chapter

The dossier requests addition of mannoproteins for the prevention of haze development in bottles of wine. Specifically, the addition of mannoproteins has the effect of preventing the nucleation of tartaric acid, preventing their crystallisation and so preventing the formation of tartaric acid haze or sediment. Regulation (EC) No 606/2009 additionally includes its use for protein stabilisation of wine but this use is not specifically mentioned in the dossier.

The request confirms that mannoproteins are derived from yeast, *Saccharomyces cerevisiae*, and are normally present in wine at low levels due to the autolysis of the yeasts for the use in winemaking. Mannoproteins are natural constituents of yeast cell walls, and consist of complexes of peptide chains attached to polymeric mannose molecules.

Authorisation in general production and in organic production

Authorised in non-organic wine according to Regulation (EC) No 606/2009, Annex I A point 35 and OIV-Resolution Oeno 26/2004, for the tartaric and protein stabilisation of wine. Currently it is not permitted in the EU organic regulation for any purpose. Yeasts are authorised in organic wine production according to Regulation (EC) No 889/2008, Annex VIIIa.

Agronomic use, technological or physiological functionality for the intended use

Mannoproteins are extracted from yeast cell walls. Yeast is normally commercially produced by growth on molasses with additions. The Italian dossier reports that the mannoproteins may be prepared either as a powder or as a solution. In the former case yeast cell walls are hydrolysed with betaglucanase followed by filtration and drying. Mannoproteins solution is prepared by autolysis of the yeast followed by removal of insoluble fragments by filtration, then partial hydrolysis with enzymes, concentration, heat treatment, and filtration. The solution must be stabilised, usually with the addition of sodium bisulphite.

Today, organically produced yeast mannoproteins are available on the market.

Necessity for intended use, known alternatives

The main tool for clarification in organic wine making is low temperature treatments (which in some case may lead to high energy consumption). Additionally, a number of additives are already available in the EU organic Regulation (Annex VIIIa to Regulation (EC) No 889/2008), including the filtration agents: perlite, cellulose and diatomaceous earth. The following clarification aids are also allowed: edible gelatine, plant proteins from wheat or peas, isinglass, egg white albumin, tannins, casein, potassium caseinate, silicon dioxide, bentonite and pectolytic enzymes. However, the stabilisation of wine is complex and a number of techniques may be needed to ensure stability in a range of conditions and types of wine. The most relevant for the stabilisation of protein is bentonite. For the stabilisation of potassium tartrate formation the most relevant are cold treatments, meta-tartaric acid and arabic gum.

http://www.oenologuesdefrance.fr/gestion/fichiers_publications/493_ART259_2_S.pdf

Storage and ageing of wine, including the yeast that was used to ferment it (lees), will result in some dissolution of naturally occurring mannoproteins into the wine and help the stabilisation. However, the process can take long time and lees are not always of a good quality depending on the vintage. The addition of commercial mannoproteins can reduce the length of storage time on the lees, as well as prevent the formation of off flavours (oxidation, bad taste etc). (Dubourdieu D. & Moine V., 1995)

As the majority of cellars in the EU are small, it is relevant to assess their access to technologies and that way evaluate the need for allowing the use in organic production. (KLIS F.-M., (1994) (BALLOU C.-E., (1982))

Alternatives to mannoprotein addition are listed in the dossier. They include the following:

- addition of meta-tartaric acid, permitted in annex VIIIa to Regulation (EC) No 889/2008, although this is reported as only providing short term stability
- cold stabilisation, permitted in organic winemaking.
- electro dialysis, specifically prohibited in organic winemaking in the EU regulation
- carboxymethyl cellulose, not permitted in organic winemaking in the EU regulation

Origin of raw materials, methods of manufacture

The raw material for manufacture of mannoproteins is yeast. The substance is therefore microbiologically derived. Yeast is usually grown commercially on molasses, with the addition of inorganic nitrogen and other additives. While molasses is unlikely to be a GM risk at present, other ingredients of the substrate may be GM derived. However, this issue is not normally considered when assessing whether the additive is derived from a GMO. To exclude any risk by the use of commercially produced yeast mannoproteins, and to be consistent with the rules of the organic regulation, it is advisable to allow the use of only mannoproteins extracted from organic produced yeast, which is available on the market.

Powder: Hydrolysis of cellular walls of yeasts with enzymes betaglucanase, microfiltration, ultrafiltration, drying

Solution: Autolyse of yeasts, elimination of the insoluble walls by centrifugation, the soluble mannoproteins recovered by micro-filtration then ultrafiltration of the floating, partial hydrolysis, concentration, Ultra-High Temperature treatment (UHT), cooling, filtration, stabilisation with sodium metabisulphite.

Environmental issues, use of resources, recycling

The growth of yeast on molasses based substrate produces large volumes of waste substrate, which must be disposed of in an environmentally sustainable manner. However, the overall addition to the total of this concern, caused by the relatively small amount of use of yeast to produce mannoproteins for wine stabilisation, is unlikely to represent a significant addition to the concern. Further, mannoproteins based on organic yeast are available in the market. Compared to physical methods of stabilisation of wine, e.g. cryo-techniques, the use of mannoproteins is based on much lower energy consumption and investment. Reference: IFV(French institute of wine) ASSESSMENT GRID OF THE OENOLOGICAL PRACTICES.

Animal welfare issues

No animal welfare issues arise in the manufacture or use of mannoproteins.

Human health issues

No human health issues have been identified in the production or use of mannoproteins to stabilise wine. However, commercial mannoproteins may be in the form of powder or solution.

The solution is normally stabilised with up to 0.7% sulphite. Depending on addition level to the wine this could contribute as significant level of sulphites to the wine itself, sufficient to require labelling of the sulphite content. Calculation from the data sheets indicate that the addition could be a maximum of 1.5ppm, 15% of the level at which labelling of the sulphite concentration is required. Anyhow it contributes to wine total sulphite content and should be considered for the respect of maximum levels allowed. These products (containing sulphites) should not be allowed in the case of wines labelled as “not containing added sulphites”.

Food quality and authenticity

Wine has been traditionally aged on the lees, resulting in dissolution of mannoproteins from autolysed yeast. The effect of mannoproteins, including improved tartaric (Lubbers, 1993 ; Moine-Ledoux, Dubourdieu, 1997 ; Moine-Ledoux, Dubourdieu, 1999) and protein ((Ledoux et al., Waters et al., 1994)) stability and improved mouthfeel (Paulus, Haas, 1980 ; Voilley, Lamer, 1990 ; Lubbers, 1993 ; Lubbers, 1994), have been recognised in scientific literature since 2000.

Traditional use and precedents in organic production

As stated above, the incorporation of mannoproteins into wine by maturation on the lees is a traditional process and has been used to improve the mouthfeel and stability long before science had identified mannoproteins. However, the addition of purified mannoprotein for this purpose cannot be considered a traditional process.

One paper discusses the use of strains of yeast that naturally overproduce mannoprotein and conclude that this may be a preferable way to achieve improvements in the mouthfeel and reduction in astringency in red wines, compared to the addition of commercial mannoproteins. However, requiring organic winemakers to use different strains of wine yeast may cause unacceptable changes in wine flavour etc. (Vuchot, 1998).

Authorised use in organic farming outside the EU / international harmonization of organic farming standards

Not specifically listed as a permitted additive in the Codex Alimentarius Guidelines for the production, processing, labelling and marketing of organically produced foods GL 32-1999.

Not specifically listed as a permitted additive in the US NOP organic regulations.

Not specifically listed as a permitted additive in the Japanese Agricultural Standards for Organic Agricultural Products 2000, as amended.

Not specifically listed as permitted in IFOAM Norms for Organic Production and Processing 2014

Other relevant issues

None

Reflections of the Group / Balancing of arguments in the light of organic production principles

The Group considers that mannoproteins are useful for the tartaric stabilisation of wine, and that they deliver advantages compared to other stabilisation methods in regard to the availability to small operators and to energy consumption.

Because of the fact that mannoproteins can be produced in organic quality, this substance should be used in preference to non-organic stabilisation agents. It should be checked if some of the other alternatives to mannoproteins can be removed from the list.

In the opinion of the Group organic mannoproteins seem to be available in sufficient quantity and quality. This information needs to be confirmed.

Conclusions

The use of mannoproteins for stabilisation of wine is in line with the objectives, principles and criteria of the organic regulation. The group considers that mannoproteins seems to be available in organic quality and should therefore be used. This information needs to be confirmed.

5.5 Enzymatic preparations

Introduction, scope of this chapter

There is a request from France for the authorisation of the use of pectinase at the must phase for the purpose of maceration in order to improve the extraction of juice and clarification. Modifications of the general wine regulation were introduced in 2013: The enzymes were removed from row 10 of the Annex I A to Regulation (EC) No 606/2009 and a new category was created in row 47 of that Annex.

Before the modification, the oenological enzyme preparations were authorised according to the OIV definition, only for clarification. With the modification (row 47), enzymes are authorised for oenological purposes in maceration, clarification, stabilisation, filtration and to reveal the aromatic precursors of grapes present in must and wine.

Authorisation in general production and in organic production

The monograph on enzyme preparations was modified and adopted in June 2009 (oen. 365/2009) by the International Organization of Vine and Wine (OIV). It defines the main activities:

- Polygalacturonase: OIV Codex Resolution: 10/2008 / n° CAS : 9032-75-1 / n° EINECS : 232-885-6
- Pectin lyase: OIV Codex Resolution: 314/2009 / n° CAS : 9033-35-6 / n° EINECS : 232-894-5
- Pectin esterase: OIV Codex Resolution: 9/2008 / n° CAS : 9025-98-3 / n° EINECS : 232-807-0
- Cellulase: OIV Codex Resolution: 8/2008 / n° CAS : 9012-54-8 / n° EINECS : 232-734-4
- Hemicellulase: OIV Codex Resolution: 313/2009 / n° CAS : 9025-56-3 / n° EINECS : 232-799-9

and the authorised applications:

- filterability of musts (OENO 14/04) and wines (OENO 15/04);
- release of aromas in musts (OENO 16/04) and wines (OENO 17/04);
- release of yeast components in wines (OENO 18/04);
- clarification of musts (OENO 11/04) and wines (OENO 12/04);
- maceration of musts (OENO 13/04);
- hydrolysis of glucans from *Botrytis cinerea* (OENO 03/85);
- hydrolysis of urea (OENO 2/95).

Enzymes for clarification are authorised under the EU organic regulation. The CNAB (French National Committee for Organic Agriculture) of INAO (French National Institute for Designations of Origin) on 4 June 2013 specified that enzymes must have a clarifying action in accordance with resolution OIV-OENO 498-2013. In consequence, the following pectinase activities are approved: polygalacturonases, pectin lyases, pectin methylesterases along with their associated activities: arabinanases, galactanases, rhamnogalacturonases, cellulases, hemicellulases.

The use of beta-glucanase is not authorised under the EU organic regulation.

These specifications are given on page 48 of the French guidelines (INAO publication) regarding annex VIIIa of Regulation (EC) n° 889/2008.

Enzymes are authorised in organic food processing as per Article 27(1)(b) of Regulation (EC) No 889/2008.

According to the EU organic wine regulation (EC) No 203/ 2012, only pectolytic enzymes for clarification are authorised.

Agronomic use, technological or physiological functionality for the intended use

An enzyme is a protein, a biological catalyst, which allows the speeding up of biochemical reactions without modifying them. Commercial enzyme preparations serve above all to improve the processes during vinification. The enzymes present in industrial preparations are never totally absent from the grape, the yeast or the microbial flora. The addition of external enzymes is generally justified by their low level of activity found in grapes or yeasts. This addition speeds up and optimises the phenomena required by the winemaker. Enzymes are removed and inactivated by bentonite, which ensures that they do not remain in the wine.

The main activities of pectolytic enzymes or pectinases are pectin lyase (PL), pectin methylesterase (PME) and polygalacturonase (PG). Their action can be reinforced by hemicellulases or hemicellulolytic (Endo (1-4) - D- xylanase (XYL), Endo (1-4) - D- galactanase (Gal)) and by cellulases or cellulolytic enzymes (Endo and Exo (1-4) - D- glucanase (CEL)). These enzymes ensure the degradation of a large number of components of the cell wall.

Applied to harvested grapes, enzyme preparations will facilitate:

- must extraction operations such as draining and pressing,
- settling operations.

Added to musts and wines they facilitate:

- clarification,
- improved filterability.

The use of enzyme preparations allows for rapid breakdown of the pectin and other components present in the plant cell walls which impair draining and pressing, and ensures sedimentation of particles suspended in the musts. Through their secondary activity, they can also take part in releasing colouring matter and aromatic molecules present in the skins of the grape berries.

Necessity for intended use, known alternatives

In the winemaking, enzymatic preparations are mainly used for clarification/filtration and maceration of white wine and rosé. By breaking down the pectin, the pectolytic enzymes provide a number of technical advantages, such as acceleration of the preformation stages, clarification and pressing.

There are other alternatives in organic wine processing for the clarification/filtration activity: Edible gelatine, plant proteins from wheat or peas, isinglass, egg white albumin, tannins, casein, potassium caseinate, silicon dioxide, bentonite.

They all have different impact on the product, colour, structure, etc., and they are used by vinegrowers depending on the product they aim for. Enzymatic preparation used for wine clarification is one of the methods that makes the lowest modification of wine, and is used only for clarification purposes.

For maceration, the enzymatic method is the most efficient one, but there are other techniques available, mostly physical ones. For example, the length of pressing on white and rosé can be raised, an intensification of pump-over can be achieved, an increase of unballasting, or more pipeage for red. However, those techniques can also have bad impact on wine by raising bitterness, astringency and harsh tannins.

Origin of raw materials, methods of manufacture

Enzymatic preparations can be made from micro-organisms or plants. When looking for synergies between various enzymatic activities, including pectinase, cellulase and hemicellulase, mixtures of preparations made from different strains can be prepared. These preparations can contain one or more active compounds, in addition to supports, diluents, preservatives, antioxidants and other substances compatible with the good manufacturing practices and in accordance with local regulations. In certain cases, preparations can contain cells or cell fragments. Furthermore, they can be in either liquid or solid form. The active substances can also be immobilised on a support admitted for food use.

A controlled fermentation is done by the microorganism under the addition of chosen nutritional elements. After the fermentation enzymes are extracted with some water, spin-dried, concentrated, filtered, annihilated (granular powder), diluted and stabilized (solution).

Environmental issues, use of resources, recycling

It is the same as classic fermentation, but with a need for control of the fermentation, centrifugation, filtration and drying, which implies energy use. The preparation is easily biodegradable and the use of water is small.

Animal welfare issues

Not relevant.

Human health issues

The microbial sources of enzymes must be non-pathogenic, non-toxic and genetically stable, and the fermentation broth should not leave harmful residues in enzymatic preparations. In the case of microorganisms, a safety study must be conducted in order to ensure that enzymatic preparation produced by a microorganism species (e.g. *Aspergillus niger*) does not present any health risk.

Food quality and authenticity

The use of enzymes in maceration is increasing the juice yield. There is some modification of colour and structure but mainly due to a secondary effect. Those modifications can also be obtained by mechanical treatment. So, the use of enzymes can help reducing the use of those mechanical treatments, such as longer pressing, heat treatment for white and rosé, and pumping-over in reds.

There is not clearly a modification of the nature of product, but more a modification of some parameters in white and rosé, enabling the rapid degradation of the pectin present in the plant cell walls, that hinder draining and pressing, sedimentation of suspended particles in the must, and the release of the coloured and aromatic compounds present in the skin of grape berries. We have to keep in mind that, technically speaking, the addition of pectinase in the must improves the clarification and leads to a reduction in the use of products for wine stabilisation in the ageing process. Also, their application to harvested grapes allows for more rapid clarification and gentler pressing, favourable to maintaining of the quality and authenticity of the product.

The release of the aromatic precursors by means of enzymes such as beta-glucosidase, is different and clearly not in line with the organic regulation, because that would mean modifying the true nature of the product. Aromatic molecules are partly in the form of glycosides, while most of them are related to glucose. The glucosidase activity can cut this connection attending the revelation of flavour, and increase the aromatic sensation to a level that modifies the true nature of the product.

Traditional use and precedents in organic production

Today, only enzyme preparations for clarification purposes are authorised in organic winemaking. Yet, enzymes not present in the grapes can aid juice extraction and increase yields, while at the same time helping with clarification. It is thus possible to reduce the length of press cycles and obtain more compact lees. The authorisation of this application would contribute to better exploitation of grapes and would favour the quality of mainly white wines by reinforcing aroma precursors and flavours.

Authorised use in organic farming outside the EU / international harmonisation of organic farming standards

Enzymes are authorised:

- Bio Suisse (Regulations completing the Technical specifications Version 2014): authorizes the use of pectinases guaranteed to be free from GMOs
- NOP (Electronic Code of Federal Regulations (eCFR) version 2014) category "Made with organic grapes": authorizes enzymes derived only from edible, non-toxic plants, non-pathogenic fungus or non-pathogenic bacteria, certified free from GMOs

Other relevant issues

Not relevant.

Reflections of the Group / Balancing of arguments in the light of organic production principles

Enzymes are natural substances separated by physical properties (by ultrafiltration) naturally occurring in grape and wine. In winemaking, bentonite fining for protein stabilisation inactivates the enzymes, which are therefore not present in the final wine. Enzymes can therefore be accepted for the production of organic wine. It is foreseen that in the future, the organic production of some of these enzymes will be possible.

It is difficult for the organic inspection bodies to determine in which phase is the enzymatic product used, because between the two phases, maceration and alcoholic fermentation the time is short (few days). It seems to be more pertinent to refer to the type of enzyme preparation than to the phase of use of the enzyme.

The enzymes currently listed in Annex VIIIa to Regulation (EC) No 889/2008 can be accepted as such. If new enzymes are authorised in wine regulation, the Group has the opinion that new enzymes should be separately evaluated for organic wine preparation.

However, the Group is also of the opinion that there should be a complete review of the role of technical enzymes in organic food processing in general.

Currently the use of technical enzymes in food processing is discussed in public. Over the last decades, the industry has developed a tremendous number of technical enzymes with very specific technological properties for and nearly all possible applications in food processing. European legislators have already answered to this situation by establishing rules for the evaluation and authorisation of enzymes in Regulation (EC) No 1332/2008 of the European Parliament and of the Council⁶.

Currently, all types of technical Enzymes for the processing of organic foods are accepted as processing aids, as long as they are not produced from or by GMOs. Enzymes are biochemical key compounds which influence the food on the molecular level. Therefore, they have potential

⁶ Regulation (EC) No 1332/2008 of the European Parliament and of the Council of 16 December 2008 on food enzymes and amending Council Directive 83/417/EEC, Council Regulation (EC) No 1493/1999, Directive 2000/13/EC, Council Directive 2001/112/EC and Regulation (EC) No 258/97 (OJ L 354, 32.12.2008, p. 7)

to change the “true nature” of foods and to change the technological processes fundamentally applied. For these reasons, an overall framework for the use of such technical enzymes in the processing of organic food is required as a basis for the evaluation of single technical enzymes.

Conclusions

The listing of enzymes as mentioned in Annex VIIIa to Regulation (EC) No 889/2008 is currently in line with the objectives, principles and criteria of organic regulation. However, there should be a complete review of the role of enzymes in organic food processing in the future. In case new enzymes are authorised in the general wine regulation the authorisation for organic wine production should be separately evaluated.

5.6 Use of inactivated yeasts, autolysates of yeast and yeast hulls

Introduction, scope of this chapter

Since December 2013, two yeast derivatives have been newly defined from a strictly regulatory point of view (Commission Implementing Regulation (EU) No 1251/2013⁷): “inactivated dry yeasts” (IDY) and “autolysates”.

The “organic wine” regulations provide that any changes to oenological practices, processes and treatments introduced after 1 August 2010 should be subject to an evaluation by the European Commission (Article 29d(5) of Regulation (EC) No 889/2008). In the meantime, these products and techniques remain prohibited in organic wine. This is the case for autolysates and inactivated yeasts.

Before 2013 and the new regulation of the OIV, all the yeast derived products were considered in the same point in the European wine regulation (EC) No 606/2009 and there was no legal and technical distinction between yeast cell walls, IDY and, autolysates. So these two yeast derivatives had been used by vine growers in the 2012 and 2013 vintages. Further, these inactivated kinds of products were and are available on the market with organic agriculture certification.

The purpose is the technical applications of autolysates and inactivated yeasts in the organic wine regulation.

France asked for addition of autolysates to the list of permitted additives for wine in Annex VIIIa to Regulation (EC) No 889/2008.

Authorisation in general production and in organic production

Permitted as a processing aid for wine in Regulation (EC) No 606/2009: Row 6 Annex I A (as amended by Regulation (EU) No 1251/2013): Use to encourage yeast growth. Only with fresh grapes, grape must, partially fermented grape must, partially fermented grape must obtained from raisined grapes, concentrated grape must and new wine still in fermentation.

Until now, the different commercial preparations derived from yeasts are not categorised in wine regulation. The authorisation is currently based on OIV resolutions (Autolysates OENO 496-2013, inactive yeast OENO 459-2013).

Agronomic use, technological or physiological functionality for the intended use

Thanks to their assimilable nitrogen content and other ingredients which support fermentation, yeast autolysates and inactivated dry yeasts (IDYs) are mainly used as nutrients for the

⁷ Commission Implementing Regulation (EU) No 1251/2013 of 3 December 2013 amending Regulation (EC) No 606/2009 as regards certain oenological practices and Regulation (EC) No 436/2009 as regards the registering of these practices in the wine sector registers (OJ L 323, 4.12.2013, p. 28)

rehydration of active dry yeasts for alcoholic fermentation, as well as nutrients during the alcoholic fermentation. They facilitate the process of fermentation by the addition of yeast nutrient compounds: organic nitrogen, vitamins, assimilable amino acids and others.

IDYs can also be used in the steps for wine maturing and clarification operations (Pozo-Bayón et al. 2009).

Necessity for intended use, known alternatives

Up to now, diammonium hydrogen phosphate (DAP) is the only possibility permitted in Annex VIIIa to Regulation (EC) No 889/2008 as a nitrogen source for yeast nutrition (maximum dose of 100g/hl).

The yeast derived products have additional properties. Beside nitrogen in organic form as e.g. amino acids, they offer vitamins and other trace elements useful for yeast growth.

The yeast derived products are offering the opportunity for well-balanced nutrients support for yeast growth. (CPER Project 2012-2014: « Vinif Bio »: Study of the impact of various forms of nitrogenous nutrition in organic wine making, ICV, IFV, Inter Rhône, Sudvinbio).

Medium and high nitrogen deficiencies cannot be compensated by yeast derived products alone. Therefore DAP needs to be additionally available for organic wine production.

Different yeast strains have also different requirements for nitrogen sources and other nutrients (Bell and Henschke (2005), Bohlscheid et al. (2006), Lafon-Lafourcade et al. (1979), Wang et al. (2003)).

Yeast cell walls (from organic yeast strains) are already authorised in organic wine making regulation with a maximum dose of 40g/hl. However, they are used for their role in detoxification of the milieu, along with their capacity to absorb medium-chain fatty acids (C8, C10 and C12). The latter, which are toxic for yeasts, inhibit the alcoholic fermentation by disturbing membrane transfers in yeast cells. The yeast cell hulls fix these fatty acids. Rich in survival factors, they reinforce the yeast membrane during growth, but do not supply nutrients (growth factors). Yeast cell walls also provide sterols which accelerate yeast growth.

Thiamine is as well already authorised in organic wine making regulation as a nutrient of active dry yeasts with a maximum dose of 60 mg/hl. Thiamine facilitate active yeast metabolism, but is not used as nitrogen nutrient. Even if yeast derived products contain thiamine, the concentration is not sufficient to cover the need of wine yeast.

Origin of raw materials, methods of manufacture

Autolysates and IDYs are derived by yeast biomass of the genus *Saccharomyces* after autolysis induced by heat and / or pH changes. Autolysis is defined as the self-digestion of proteins and other cellular components by specific enzymes contained in yeast cells.

Environmental issues, use of resources, recycling

None identified with normal production and use of autolysates/IDYs.

Animal welfare issues

None

Human health issues

No ADI.

QPS (Quality Presumption of Safety) of yeasts: “Yeasts are considered amongst the safest of microorganisms.”

http://www.efsa.europa.eu/sites/default/files/scientific_output/files/main_documents/sc_op_ej58_7_qps_en.3.pdf

Already authorised by the food safety expert of the OIV.

Food quality and authenticity

Autolysates and IDYs are natural products that can be considered as only endogenous to wine, because they are only derived from the yeast which is fundamental for organic winemaking. Regulation (EC) No 1254/2008⁸, amending Regulation (EC) No 889/2008, defines the rules for the production of organic yeast. For the 2013 vintage, there were three organic certified inactive yeast commercial preparations available on the market. These oenological products meet the demand of Regulation (EC) No 203/2012 and organic yeast derived products are commercially available.

Traditional use and precedents in organic production

Traditionally used as a yeast nutrient in fermentations for non-organic wine and organic wine before 2013 at a maximum rate of 40g/hl, but without restrictions on use.

Before 2013, all commercial preparations made of inactivated yeasts or of yeast products were considered, from a strictly regulatory point of view, as “yeast cell walls” (point 15 of the annex I A of Regulation (EC) No 606/2009, as amended) and permitted in organic winemaking (according to the conditions of use defined by the Common Market Organisation).

Three distinct yeast derived products are now defined from a regulatory point of view (Regulation (EU) No 1251/2013: autolysate, IDYs and yeast cell walls). Therefore, since 2013, autolysates and IDYs cannot be used in organic wine because they are considered as new products, recently included in the general wine regulation (Regulation (EC) No 606/2009).

Authorised use in organic farming inside and outside the EU / international harmonisation of organic farming standards:

- EU organic regulation. Not permitted for any uses at present because not included in Annex VIIIa to Regulation (EC) No 889/2008.

- OIV: authorised in the International Oenological Codex (resolution OIV-OENO 496-2013 autolysates, resolution OIV-OENO 459-2013 IDYs), and in the Code of oenological practices (II.2.3-3 / 2. MUST, 2.3.2. FERMENTATION ACTIVATORS (OENO 7/97; OENO 14/05)).

- US NOP: “Made with organic grapes” and “organic” categories: Autolysates are authorised and certified “organic” if commercially available for the “organic” category. It should be noted that commercial preparations containing autolysates, yeast cell walls and inactivated yeasts, are validated as compliant for use in the NOP. Diammonium phosphate is not allowed in the US and therefore cannot be used in organic winemaking and exportation to the US market, which represent a technical barrier for European organic wines.

- Switzerland Bourgeon: deactivated yeasts are authorised at up to 5% by volume of the final product.

Other relevant issues

None

⁸ Commission Regulation (EC) No. 889/2008 laying down detailed rules for the implementation of Council Regulation (EC) No. 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control (OJ L 337, 16.12.2008, p. 80)

Reflexion of the Group / Balancing of arguments in the light of organic production principles

The Group has the opinion that organic yeast derived products should be authorised for the production of organic wine. DAP (allowed alternative in organic wine-making) is not of natural origin and is not extracted by natural products (it is based on a chemical reaction), so the yeast derivatives are preferable in terms of fulfilment of organic principles. The group has the opinion that, beside the authorisation of the yeast derivatives, DAP needs to be maintained because the yeast derivatives cannot totally compensate for the necessary nitrogen requirements of active yeasts.

It has to be considered that in the NOP requirements DAP is not accepted, so yeast derivatives can be an alternative in organic wines for the US market.

The Group is aware that there are number of sources of organic yeast derived products commercially available, but has not the full market overview. The availability of those products in sufficient quantity and quality needs to be checked.

Conclusions

The use of inactivated yeast, autolysates of yeast and yeast hulls for organic wine making is in line with the objectives, principles and criteria of organic regulation. The availability of those products in sufficient quantity and quality needs to be checked.

5.7 Use of Protein extracts of potato

Introduction, scope of this chapter

Since December 2013, a new source of plant protein from potato has been added to the list of products which can be used for must and wine fining (Regulation (EU) No 1251/2013).

This dossier aims to provide technical references on this new product for a possible authorisation in the organic regulation. The report concerns the French application for addition of protein extracts of potato to the list of permitted additives for wine in Annex VIIIa row 10 of Regulation (EC) No 889/2008.

Authorisation in general production and in organic production

Plant proteins from potatoes were introduced into the list of plant proteins authorised for clarification by Regulation (EC) No 1251/2013, which amends Annex I A to Regulation (EC) No 606/2009.

No condition or limit on the use of potato protein extract is defined by the wine sector CMO, in the same way as for the other plant proteins. The maximum rate of use recommended by the OIV is 50g/hl.

As of now, the organic regulation allows the use of plant proteins from wheat and peas according to the conditions of use defined by the wine sector CMO.

Agronomic use, technological or physiological functionality for the intended use

For clarification and reduction in turbidity, potato protein (patatin) extract also shows a quite high zeta potential (15.5 mV +/-0.2 to 17.9mV +/- 1.5 according to different publications). This potential, combined with the speed of sedimentation, means potato protein extract has a good performance with regard to settling of bound particles.

The fining of must before the alcoholic fermentation (AF), at the moment of settling or at the start of AF, is an interesting practice for the elimination of oxidisable compounds in white and rosé wines. These pre-fermentation oxidation phenomena contribute generally to a change in the colour of the wine towards orange, which is irreversible and unwanted especially in rosés.

Necessity for intended use, known alternatives

There are a number of possible alternative substances or treatments already authorised for organic wine making: Wheat or pea vegetal proteins, albumin, casein or gelatine and yeast protein extracts.

Potato protein extract is of interest compared to the traditional fining agents, pea proteins, PVPP (Polyvinylpolypyrrolidone) or casein, with a strong impact on reduction of phenolic compounds responsible for yellow colour. This type of fining keeps the colour pinker and less orange. By comparison, charcoal has a strong decolorizing effect, more on reds than on whites, with the risk of an orange tint appearing.

Potato protein extract is today the extract most concentrated in proteins, requiring lower dosage than other vegetable protein coming from pea, wheat and/or animal proteins. The organic regulation allows the use of plant proteins from wheat and peas according to the conditions of use defined by the wine sector CMO.

Origin of raw materials, methods of manufacture

Potato protein is extracted with water from potato (*Solanum tuberosum*). Extracts are made mainly from proteins and may contain, as minor components, carbohydrates (fibre, starch, and sugar), fats and minerals. They are destined for human consumption.

The protein fraction is obtained by chromatography and ultrafiltration. The separation process yields two protein extracts with different molecular weights: a fraction with high molecular weight > 35kDa, the richest in patatin, and a fraction with low molecular weight (>4kDa but <35kDa).

Potato protein is not listed as an allergen as per Commission Directive 2007/68/EC⁹ and needs not therefore be declared on the label, unlike other plant proteins from wheat or other protein fining agents such as casein or albumin.

Composition, characterization

There is a wide variety of proteins in potatoes: the main one is patatin. It is a glycoprotein which makes up to 40% of the soluble proteins in the potato tuber. This protein extract has a strong technological interest because of its high solubility and its emulsifying and foaming capacity.

The molecular weight distribution for potato protein is quite close to that of pea fining agents. The high proportion (around 70 %) of patatin with a molecular weight of 45kDa gives it a profile similar to that of albumin.

Environmental issues, use of resources, recycling

Biodegradable product derived from an agricultural source. During the operations of clarification, the removing of the glue produce some waste (glue +lees) that need to be recycled like other fining products, e.g. bentonite.

⁹ Commission Directive 2007/68/EC of 27 November 2007 amending Annex IIIa to Directive 2000/13/EC of the European Parliament and of the Council as regards certain food ingredients (OJ L 310, 28.11.2007, p. 11)

Animal welfare issues

None

Human health issues

None

Food quality and authenticity

The main impact is on the colour of white and rosé wines in the same way as other fining products. No risk of misleading the consumer.

Traditional use and precedents in organic production

Potato proteins are mainly used as a substitute to PVPP for the management of colour in white and rosé wines.

Authorised use in organic farming outside the EU / international harmonisation of organic farming standards

- The 2014 updates to the regulations of the technical specifications for private organic bodies ((e.g. Bio Suisse)) do not specify any restriction on the nature or origin of plant protein fining agents when they are authorised. The rationale leads to consider potato protein extract as acceptable as peas or wheat. However, organic origin should be required and mentioned in the private organic bodies' regulation if commercially available.

- In the NOP regulation, potato protein is allowed both for the production of "wine made with organic grape" and "Organic wine" since 2014 and its origin should be organic if commercially available.

- For the Swiss BOURGEON label, it is allowed since 2014 and it must be from organic origin. It is authorised by Delinat private standards since 2014.

- Biodynamic labels were not updated after the allowance for the use of the product in wine, so Demeter and Biodyvin do not allow it.

Other relevant issues

No

Reflections of the Group / Balancing of arguments in the light of organic production principles

Potato protein extract has no allergenic potential compared to other protein sources allowed for organic wine making. Some of the other protein sources with allergenic potential can be replaced by potato proteins.

The effectiveness of potato protein extract on must or wine gives an alternative technical solution to organic winemakers. It can also deliver the same technological properties as PVPP, which is not allowed in organic wine making.

Potato protein is available in organic quality. Therefore it should be used only in organic form.

In the Group's opinion it should be assessed if other proteins, like protein from wheat or pea, or gelatine, are available today in sufficient quantity and organic quality, so that the regulation would be adapted consequently.

Conclusions

The use of potato protein for fining of wine is in line with the objectives, principles and criteria of the organic regulation. The group considers that potato protein is available in organic quality and should therefore be used as such.

5.8 Protein extracts of yeasts for clarification*Introduction, scope of this chapter*

Since June 2012 (Oenological Codex OIV-OENO 452-2012), a new fining agent derived from yeast for must (Code of Oenological Practices OIV-OENO 416-2011) and wine (Code of Oenological Practices OIV-OENO 417-2011) has been validated.

Following this OIV validation, Commission Implementing Regulation (EU) No 144/2013 has amended Regulation (EC) No 606/2009 by adding yeast protein extracts for must and wine fining in Annex I A row 10.

The French dossier asks for addition of protein extract of yeast to the list of permitted additives for wine in Annex VIIIa row 10 of Regulation (EC) No 889/2008.

Authorisation in general production

The introduction of yeast protein extracts for must and wine fining by the OIV in the Code of Oenological Practices, and its monograph in the International Oenological Codex occurred in June 2012 (OIV-OENO 452-2012).

Regulation (EU) No 144/2013 adding protein extracts « from yeast » in Annex I A to Regulation (EC) No 606/2009 listing the authorised oenological practices and treatments was adopted on 19 February 2013.

Agronomic use, technological or physiological functionality for the intended use

Yeast protein extract is used for must and wine clarification.

- On must: sticking to control excessive tannin content, eliminate potentially oxidisable polyphenols on white and rosé wines. It allows a clearer perception of flavours and stabilisation of wine toward oxidation.
- On wine: It respects the white, rosé and red colour. By removing some of the tannins and polyphenols it decreases bitterness and dryness in red wine. It also eliminates the masking effect of tannins.

It forms significantly fewer lees than fining treatment with animal products.

Necessity for intended use, known alternatives

- Clarification and turbidity reduction:

Traditional protein fining agents, such as gelatine or egg albumen are commonly used for red wine fining in order to obtain a clarification as well as an organoleptic improvement (astringency and bitterness decrease). Trials carried out with yeast protein extracts in comparison with these traditional fining agents gave similar results as far as clarification is concerned.

- Removal of phenolic compounds responsible for bitterness of white wines:

Yeast protein extracts usage scope is very wide. Its origin derived from yeast allows its use on all types of wine. Yeast protein extracts indeed show a fining action as efficient as isinglass, traditional white wine fining agent.

Yeast protein extracts are specially adapted for must and wine with a high level of tannins.

- White wine fining with yeast protein extracts allows removing bitterness in wines, issued from ageing phase:

Protein extract from pea and wheat are already authorised (row 10 of annexe VIIIa to Regulation (EC) No 889/2008) in the EU organic regulation. These products can be used but they hold allergenic potentials.

Origin of raw materials, methods of manufacture

Yeast protein extracts mainly come from the cytoplasm of *Saccharomyces* spp. The yeast protein extracts are in the form of powder, generally with micro-granulate, of yellow to light beige or beige colour, with a slight smell of yeast.

The yeast protein extracts are water-soluble but not ethanol-soluble. When in aqueous solution, they precipitate if 1 volume of ethanol is added.

The total protein content of yeast protein extracts must represent more than 50% of the dry product. At least 50% of the total proteins must have a molecular weight greater than 15kDa, and the amine nitrogen content given as glycine, represents 10 to 20% of the dry product maximum.

Yeast extracts are available in organic quality. Whether yeast protein extract is available in sufficient organic quality and quantity is not known by the group and needs to be further investigated.

Environmental issues, use of resources, recycling

They are biodegradable product based on yeast. During the operations of clarification, the removing of the glue produces some waste (glue +lees) that needs to be recycled like other fining products such as bentonite.

Animal welfare issues

None

Human health issues

Non

Food quality and authenticity

It is performing the same work as albumin and gelatine, two traditional fining products, but has the advantage of no allergic risk, so does not need a warning label.

Traditional use and precedents in organic production

None

Authorised use in organic farming outside the EU / international harmonisation of organic farming standards

Yeast protein extracts have been authorised in the scope of the wine COM in June 2012. Private specifications on organic wine do not specify any restrictions on the nature or the origin of protein fining agents when authorised. Therefore, yeast protein extracts could be used as well as the other protein fining agents. On the other hand, the organic origin is generally requested if commercially available.

Other relevant issues

None

Reflections of the Group / Balancing of arguments in the light of organic production principles

Yeast protein extract is the first protein fining agent which is extracted from yeast *Saccharomyces* sp. Yeast is naturally present during wine production. All other fining agents allowed in organic production are of mineral (ex. bentonite), or animal (ex. casein, egg albumen), or plant (ex. pea or potato proteins) or microbial (ex. chitin) origin, none of them naturally occurring in the wine-making process.

Yeast protein extracts are produced in organic quality. The group has no evidence on the availability of organic yeast protein extracts as regards quality and quantity. This needs to be further investigated.

Conclusions

The use of yeast protein extracts for wine fining is in line with the objectives, principles and criteria of the organic regulation. The group considers that it can be produced in organic quality. If organic yeast protein extracts are available in organic quality they should be used.

5.9 To reassess the use of the following substances already discussed in other EGTOP reports

Introduction

The mandate is asking for reassessment of the use of the following substances already evaluated in EGTOP Food reports I and III.

- 1) FR dossier (2011): Ammonium bisulphate, ammonium sulphate (E517), chitin-glucane and chitosan for use or addition in organic products of the wine sector
- 2) DE dossier (2011) for Thiamin hydrochloride and Diammonium hydrogen phosphate for the fermentation of organically produced fruit wines and meads
- 3) DE dossier (2008) Wood fibres as specific filter aid for wine
- 4) EGTOP suggestion in Food I report about sulphur dioxide and potassium metabisulphite for the production of fruit wine with and without added sugar at 100 mg/l

Concerning **wood fibre** use, the dossier does not refer to use in wine-making. As a matter of fact, the substance is not allowed so far by the wine regulation, nor was any dossier submitted to the OIV in order to start up the authorisation process. Therefore, the group does not express any evaluation.

Conclusions of EGTOP Food Report I and Food Report III

EGTOP Food III

5. *The Group considers that the addition of ammonium sulphate to Annex VIIIa to Regulation 889/2008 is not necessary due to the availability of other suitable yeast nutrients (Article 21.1(ii) of Regulation 834/2007).*

6. *The Group considers that the addition of ammonium bisulphite to Annex VIIIa is not in line with the objectives, criteria and principles of organic farming, as laid down in Regulation 834/2007 (Article 21.1(i)) thanks to the availability of other suitable sources of sulphites.*

7. *The Group cannot take a firm decision on chitosan due to the lack of proof that the substance will enable reduction in use of sulphur dioxide. The applicants are encouraged to submit further data which proves the claim that sulphur dioxide will be reduced.*

8. *The Group considers that addition of chitin-glucan to Annex VIIIa is not in line with the objectives, criteria and principles of organic farming as laid down in Regulation 834/2007 (Article 21.1(ii)), due to the lack of necessity.*

EGTOP Food report I

Thiamin hydrochloride and Diammoniumphosphate

The use of thiamin hydrochloride and diammonium hydrogen phosphate as processing aids is in line with the objectives criteria and principles of organic farming as laid down in the organic regulation. They should therefore be included in Annex VIII B as processing aids. These substances should be permitted for foodstuffs of both plant and animal origin with the specific condition that they are permitted only for use in processing of fruit wines including cider, perry and mead.

Sulphur dioxide (E220) and potassium metabisulphite (E224)

*The Group propose to have a general regulation for the use of sulphur dioxide and potassium metabisulphite for the production of fruit wine, as well as mead, with and without added sugar 100 mg (**)/l*

() In this context, "fruit wine" is defined as wine made from fruits other than grapes. (including cider and perry)*

*(**) Maximum levels available from all sources, expressed as SO₂ in mg/l.*

Another request was about the use of E 220 and E 224 in mead.

Mead is an animal product; therefore, the restrictions under Specific Conditions fully apply to animal products. This means E 220 and E 224 are only accepted for one animal product which is mead.

Reflection of the Group/ Balancing of arguments in the light of organic production principles

Chitosan and chitin glucane

Chitosan seems to have better ability to eliminate contamination with *Brettanomyces* yeast than chitin-glucane, whose objective is more anti-oxydant activity. (Zuehlje JM. *et al.*, (2013) Taillandier P. *et al.*, (2015) Blöateyron-Pic L. *et al.*, (2102)).

Conclusion

The Group agrees with the Conclusion in of EGTOP Food reports I and III on Ammonium sulphate, Ammonium bisulphite, Chitin-glucan, Thiamin hydrochloride, Diammoniumphosphate, Sulphur dioxide and Metabisulphite. The Group considers now that the use of Chitosan is in line with the objectives, principles and criteria of the organic regulation.

Summary of previous EGTOP conclusions (Food I and Food III) and conclusions under this mandate

	Food I or III recommendations	Wine recommendations group	Conclusions
ammonium sulphate as yeast nutrients	No need	Agree with Food III	No inclusion
ammonium bisulphite as yeast nutrients	No need	Agree with Food III	No inclusion
Chitosan	Questioning the potentials to reduce the use of SO ₂ - more scientific data needed.	It indirectly reduces the SO ₂ use, but main positive effects on other wine problems (Brett etc;) new dossier provided with references to the use and reduction of SO ₂ . Alert: it is not allowed in NOP	Should be added to Annex VIIIa to Regulation (EC) No 889/2008
chitin-glucan	Lack of necessity	From the process point of view it is preferable to Chitosan, but no new dossier provided, only old table. Alert: it is not allowed in NOP	No inclusion
Thiamin hydrochloride and Diammoniumphosphate for use in fruit wine	Acceptable	Agree with Food I	Inclusion in Section B to Annex VIII of Regulation (EC) No 889/2008
Sulphur dioxide and potassium metabisulphite for use in fruit wine	Acceptable, justification of specific conditions (no difference on sugar content in fruit wines)	Agree with Food I	justification of specific conditions

5.10 To reassess the use of the substances already authorised in Annex VIIIa to Regulation (EC) No 889/2008

The Group is asked to reassess the use of substances already authorised in Annex VIIIa to Regulation (EC) No 889/2008. The following table provides an overview of all the substances authorised for organic wine making, and comments this list in brief.

Type of treatment in accordance with Annex I A to Regulation (EC) No 606/2009	Name of products or substances	Comments of EGTOP
Point 1: Use for aeration or oxygenation	— Air — Gaseous oxygen	
Point 3: Centrifuging and filtration	— Perlite — Cellulose — Diatomaceous earth	
Point 4: Use in order to create an inert atmosphere and to handle the product shielded from the air	— Nitrogen — Carbon dioxide — Argon	
Points 5, 15 and 21: Use	— Yeasts (1)	Use and need confirmed at current status, assessment needed on possibility to exclude the derivatives of non-organic origin, as they can probably be already 100% organic. See chapter 5.6 and 5.8.
Point 6: Use	— Di-ammonium phosphate — Thiamine hydrochloride	Use and need confirmed at current status. See chapter 5.6
Point 7: Use	— Sulphur dioxide — Potassium bisulphite or potassium metabisulphite	Use and need confirmed at current status, but the techniques available nowadays allow an important reduction in use, and it is a sensitive topic for consumers. The Group recommends to reassess the limits in due time, and meanwhile to gather data from MSs on the real use by organic producers.
Point 9: Use	— Charcoal for oenological use	Use and need confirmed at current status
Point 10: Clarification	— Edible gelatine (2) — Plant proteins from wheat or peas (2) — Isinglass (2) — Egg white albumin (2) — Tannins (2)	Some are available as organic on the market, it should be checked if some of them we can restrict to organic. Potato protein and yeast derivatives should be included here. See chapter 5.7 and 5.8
	— Casein — Potassium caseinate — Silicon dioxide — Bentonite — Pectolytic enzymes	See chapter 5.5
Point 12: Use for acidification purposes	— Lactic acid — L(+)Tartaric acid	
Point 13: Use for deacidification purposes	— L(+)Tartaric acid — Calcium carbonate — Neutral potassium tartrate	

Final Report on Wine

	— Potassium bicarbonate	
Point 14: Addition	— Aleppo pine resin	
Point 17: Use	— Lactic bacteria	
Point 19: Addition	— L-Ascorbic acid	
Point 22: Use for bubbling	— Nitrogen	
Point 23: Addition	— Carbon dioxide	
Point 24: Addition for wine stabilisation purposes	— Citric acid	
Point 25: Addition	— Tannins (2)	
Point 27: Addition	— Meta-tartaric acid	
Point 28: Use	— Acacia gum (2)	Availability as organic to be checked
Point 30: Use	— Potassium bitartrate	
Point 31: Use	— Cupric citrate	Use and need confirmed at current status
Point 31: Use	— Copper sulphate	Phased out.
Point 38: Use	— Oak chips	
Point 39: Use	— Potassium alginate	
Type of treatment in accordance with Annex III, point A(2)(b) to Regulation (EC) No 606/2009	— Calcium sulphate	

6. MINORITY OPINIONS

No minority opinion

7. LIST OF ABBREVIATIONS / GLOSSARY

CM concentrated must

RCM rectified concentrated must

CMO Common Market Organisation in Europe

PVPP Polyvinylpolypyrrolidon

CNAB French national committee for organic agriculture

INAO French National Institute for Designations of Origin

8. REFERENCES

Scientific literature

BALLOU C.-E., (1982). The yeast cell wall and cell surface. In Strathern J.N., Jones E.W. and Broach J.R. (Eds), *The molecular biology of the yeast Saccharomyces*, Cold Spring Harbor New York, pp. 335-360.

Bell S-J und Henschke P A. (2005) Implications of nitrogen nutrition for grapes, fermentation and wine. *Australian Journal of Grape and Wine Research*, 11, 242-295

Blateyron-Pic L. et al., 2012. Le chitosane d'origine fongique : un nouvel outil de choix pour lutter contre *Brettanomyces* dans les vins. *Revue des Œnologues*, 143, 27-28.

Bohlscheid J, Fellman J, Wang X, Ansen D und Edwards C. (2006) The influence of nitrogen and biotin interactions on the performance of *Saccharomyces* in alcoholic fermentations. *Journal of Applied Microbiology*, 102:390-400

Dubourdieu D. & Moine V., 1995. Rôle des conditions d'élevage sur la stabilisation protéique des vins blancs. *Actualités œnologiques* 95, C. R. du 5e Symposium international d'œnologie de Bordeaux.

KLIS F.-M., (1994). Cell wall assembly. yeast. 10 : 851-868

IFV(French institute of wine) "ASSESSMENT GRID OF THE OENOLOGICAL PRACTICES"

Lafon-Lafourcade S, Larue F und Ribéreau-Gayon P. 1979. Evidence for the existence of "survival factors" as an explanation for some peculiarities of yeast growth, especially in grape must of high sugar concentration. *Applied and environmental microbiology*, 38:1069-1073

Lubbers S., Leger B., Charpentier C. & Feuillat M., 1993. Effet colloïde-protecteur d'extraits de parois de levures sur la stabilité tartrique d'une solution hydro-alcoolique modèle. *J. Int. Sci. Vigne Vin* 27, 13-22, 65-66.

Lubbers S., Voilley A., Feuillat M. & Charpentier C., 1994. Influence of mannoproteins from yeast on the aroma intensity of a model wine. *Lebensm.-Wiss. u.Technol.*, 27, 108-114.

Moine-Ledoux V. & Dubourdieu D., 1997. "Interprétation moléculaire de l'amélioration de la stabilité protéique des vins blancs au cours de leur élevage sur lies."

Moine-Ledoux V. & Dubourdieu D., 1999. An invertase fragment responsible for improving the protein stability of dry white wines. *J. Sci. Food Agric* 79 :537-543.

Paulus K. & Haas E. M., 1980. "The influence of solvent viscosity on the treshold values of primary tastes." *Chemical Senses* 5: 23-32.

Pozo-Bayón, M.A; Andújar-Ortiz, I, Moreno-Arribas, V. (2009) Scientific evidences beyond the application of inactive dry yeast preparations in winemaking. *Food Research International* 42, 754–761

Taillandier P. et al., 2015. Effect of a fungal chitosan preparation on *Brettanomyces bruxellensis*, a wine contaminant. *J. Appl. Microb.*, 118(1), 123-131.

Voilley A., Lamer C., Dubois P. & Feuillat M., 1990. "Influence of macromolecules and treatments on the behavior of aroma compounds in a model wine." *J. Agric. Food Chem.* 38: 248-251.

Wang X D, Bohlscheid J C und Edwards C G (2003) Fermentative activity and production of volatile compounds by *Saccharomyces* grown in synthetic grape juice media deficient in assimilable nitrogen and/or pantothenic acid. *Journal of Applied Microbiology*, 94: 349-359.

Waters E., Pellerin P. & Brillouet J.-M., 1994. A *Saccharomyces* mannoprotein that protects wine from protein haze. *Carbohydrate Polymers* 23, 185-191.

Zuehlje JM. et al., 2013. Advances in the control of wine spoilage by *Zygosaccharomyces* and *Dekkera/Brettanomyces*. *Annu. Rev. Food Sci. Technol.*, 4, 57-78.

ORWINE Project